

FRED Reports

Results of Pink Salmon,
Oncorhynchus gorbuscha, Fry
Transplants to Eaglek Bay,
Prince William Sound 1984

by
Tom Kohler

Number 85



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ABSTRACT

In 1984, 1.9 million pink salmon, *Oncorhynchus gorbuscha*, fry from Cannery Creek Hatchery were transported to and released into six streams in Eaglek Bay, Prince William Sound, in an attempt to establish an odd-year return. Historically, these six streams have been excellent producers during even-numbered years but have had virtually no production during the odd-numbered years.

Adult returns in 1985 produced a spawning escapement and an estimated commercial harvest of 24,460 and 115,300 pink salmon, respectively. The average estimated total survival rate from fry to adult in the six streams was 7.3%. The escapements in 1985 were similar to those observed during even-numbered years. The estimated first-year ex-vessel value of the adult pink salmon resulting from this transplant was \$91,300, while the cost of the transplant was \$4,700.

KEY WORDS: Pink salmon, *Oncorhynchus gorbuscha*, fry transplant, Prince William Sound, survival rate, interception.

INTRODUCTION

Prince William Sound pink salmon, *Oncorhynchus gorbuscha*, do not exhibit the extreme even- and odd-year class fluctuations characteristic of many pink salmon populations. Although the relative run strengths of both the odd and even years have persisted through several cycles, no year class has been dominant (Randall et al. 1984). An exception, however, has been occurring in Eaglek Bay (northwestern Prince William Sound) where six streams (numbered 273, 276, 277, 278, 282, and 283 by Alaska Department

of Fish and Game [ADF&G]) have exhibited strong even-year returns and extremely weak odd-year returns.

Escapement into the six streams in Eaglek Bay have averaged 37,688 (range 12,690-76,410) and 170 (range 0-480) during the even and odd years, respectively, between 1975 and 1984 (Table 1). This trend has continued in spite of extended odd-year commercial fishery closures in Eaglek Bay since 1971.

In 1984 the ADF&G, Fisheries Rehabilitation, Enhancement, and Development (FRED) Division transplanted pink salmon fry from Cannery Creek Hatchery into the six streams to develop an odd-year return. This report presents the results of the first adult return from that transplant.

MATERIALS AND METHODS

Fry Transport

Emergent pink salmon fry were transported from Cannery Creek Hatchery to Eaglek Bay in 227-liter aircraft transport tanks slung under a Bell 206 helicopter. The tanks were supplied with oxygen through millipore tubing at the rate of 4-5 liters/min. The fry were released as far upstream as the terrain would permit.

Adult Returns

The pink salmon escapement into each of the transplant streams was determined by ADF&G Commercial Fisheries Division personnel using methods described by Pirtle (1977). The estimated total return was calculated by dividing observed escapement by the quantity of one minus the interception rate ($1 - .825 = .175$) for northern and western Prince William Sound (J. Brady, pers.

Table 1. Pink salmon escapement in six streams in Eaglek Bay,
Prince William Sound, 1975-1984.

	Stream Number						Total
	273	276	277	278	282	283	
1975	NS ^{1/}	290	30	10	90	60	480
1976	NS	2,080	240	2,080	3,310	4,980	12,690
1977	NS	140	0	0	40	0	180
1978	NS	12,040	2,530	3,330	3,780	6,480	28,160
1979	NS	0	0	0	0	0	0
1980	NS	9,200	500	3,120	5,980	4,700	23,500
1981	0	0	0	0	0	0	0
1982	4,750	7,400	250	4,950	5,720	4,220	27,280
1983	0	40	0	40	50	60	190
1984	8,850	11,040	1,760	3,160	27,300	24,300	76,410
Odd-Year Mean	0	94	6	10	36	24	170
Even-Year Mean	6,800	8,352	1,056	3,326	9,218	8,936	37,688

^{1/} NS: Not surveyed

comm.), and the estimated commercial catch was calculated by subtracting the escapement from the total return.

RESULTS

The fry transplant took place on 9 May 1984 and required 12 trips. Approximately 159,000 fry were transported each trip; minimal mortality was observed. The number of pink salmon fry transplanted into each stream ranged from 159,000 to 478,750 (Table 2).

The observed total pink salmon escapement into the six transplant streams was 24,460 in 1985. Dividing the escapement value by 0.175, as explained in the Methods section, gives a total return estimate of 139,771 fish. The release, escapement, catch, and return information by stream number is provided in Table 2.

The survival rate from fry to escapement ranged from a low of 0.36% to a high of 2.94%. Previous pink salmon fry transplants conducted in Prince William Sound yielded survivals to escapement of 1.2% and 1.7% at Main Bay (Kohler 1984); 0.4% and 0.1% at Hobo Creek (McDaniel et al. 1984); and 1.3% at Cannery Creek (McDaniel 1982). The average estimated total survival rate from fry to adult was 7.3%; it ranged from 2.05% to 16.8%.

A comparison of the 1985 escapement (Table 2) to the even-year escapements for 1976 through 1984 (Table 1) indicates that the fry transplants resulted in escapements well within the natural range experienced during even years. The estimated ex-vessel value of the resulting catch to the Prince William Sound commercial fishermen was \$91,300 in 1985, while the cost of the transplant was \$4,700. The benefit-cost ratio was 19.4:1 after only 1 year of returns. Subsequent odd-year returns will further increase the ratio.

Table 2. Fry releases and subsequent adult returns to Eaglek Bay streams.

Stream number	Number of fry released in 1984	Adult escapement in 1985	Estimated survival from fry to escapement (percent)	Estimated commercial catch	Estimated total return	Estimated total survival from fry to adult (percent)
273	318,000	3,800	1.19	17,914	21,714	6.83
276	318,000	9,350	2.94	44,079	53,429	16.80
277	159,000	570	0.36	2,687	3,257	2.05
278	159,000	1,550	0.97	7,307	8,857	5.57
282	477,000	3,010	0.63	14,190	17,200	3.61
283	478,750	6,180	1.29	29,134	35,314	7.38
Total	1,909,750	24,460	1.28	115,311	139,771	7.32

DISCUSSION

The primary objective of this project was to establish self-sustaining odd-year populations of pink salmon in six Eaglek Bay streams. The 1985 escapement to the streams was 24,460 pink salmon; this escapement represents an increase that is 144 times greater than the average of the previous five odd-year escapements.

The estimated survival rates obtained in this study concur with previous studies in Prince William Sound (McDaniel 1982; McDaniel et al. 1984; Kohler 1984). The transport method used for the Eaglek Bay transplants was similar to that employed at Cannery Creek: the fry were released directly into the streams. For the Hobo Creek and Main Bay transplants, the fry were stocked into net pens in the estuaries and held briefly before release.

Since no appreciable difference in estimated survival rates is evident among the different transplant strategies, future transplant projects should use whichever technique is the most feasible and economical.

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